Binary and Ternary Fission of ^{252}Cf Investigation with Gammasphere

Andrei V. Daniel[1], Gurgen M. Ter-Akopian[1], Joseph H. Hamilton[2], Akunuri V. Ramayya[2], Jan Kormicki[2], Galina S. Popeko[1], Andrei S. Fomichev[1], Alexander M. Rodin[1], Yuri T. Oganessian[1], Jerry D. Cole[3], Jae K. Hwang[2], Dennis Fong[2], Philip Gore[2], John O. Rasmussen[4], Augusto O. Macchiavelli[4], I-Yang Lee[4], Mark A. Stoyer[5], Raul Donangelo[6]

[1] *Flerov Laboratory of Nuclear Reactions, JINR, Dubna 141180, Russia*
[2] *Department of Physics, Vanderbilt University, Nashville, TN 37235, USA*
[3] *Idaho National Engineering and Environmental Laboratory, Idaho Falls, ID 83415, USA*
[4] *Lawrence Berkeley National Laboratory, Berkeley, CA 94720,USA*
[5] *Lawrence Livermore National Laboratory, Berkeley, CA 94550, USA*
[6] *Instituto de Fisica Unversidade Federal do Rio de Janeiro, Rio de Janeiro, 21045-970, Brazil*

New method of fission process investigation had been originated in our works more than 10 year ago, and it was evolved all this time. It is based on the spectroscopy of the correlated γ-rays emitted by a pair of fission fragments and by the light charged particle, in case of a ternary fission event. The method allows to extract the data of a new kind about fission process that are inaccessible by the other methods. Among these data we can mark the yields of correlated fission fragment pairs, distributions on neutron multiplicity for the different charge split of the fissile nucleus. Using these data we could restore the distribution of the excitation energy of primary fission fragments which are formed at the scission point, before their deexcitation by neutron evaporation.

Concerning ternary fission, beside usual kinematical characteristics of the light charged particles, which were estimated starting from their lowest kinetic energy, we estimated the populations of the ground and first excited states in ^{10}Be. This allowed us to estimate directly the neck temperature near the scission point which equals 1.0 ± 0.1MeV.

Email: daniel@jinr.ru